

REMARKS

The specification has been amended to add section headings in accordance with MPEP 608.01(b), and to point out that European Patent Application No. 99126005.0 has been published as EP 1 113 503 A1. EP 1 113 503 A1 is believed to correspond to U.S. Patent 6,459,035 B2 to Ziegler, and EP 0 814 365 is believed to correspond to U.S. Patent 5,990,995 to Ebihara et al. The specification has also been amended to correct several minor transcription or translation errors that occurred when translating the Swiss Priority Document No. 1442/00 into English. With regards to the Table, those skilled in the art would recognize the transcription error because $A \approx 0.32 = 0.4 \times 0.8$. For example, in the next column of the Table, $A \approx 0.68 = 0.85 \times 0.8$.

Claims 1, 3-6, 8, 9 and 13 have been amended. Specifically, claims 1, 3, 8 and 9 have been amended to overcome the Examiner's objections to minor informalities, and the present amendment is believed to have no limiting affect on the scope of these claims. Claims 6 and 8 have been amended to replace "part" with --portion--, which is believed to be clear and definite. Claim 13 has been amended to improve clarity. None of the present claim amendments are believed to limit the scope of the claims in any way.

The present amendment is believed to add no new matter to the application.

The Invention

The present invention pertains broadly to a display assembly, such as could be used in calculators, electronic watches and other electronic devices, which includes a photovoltaic cell and an electro-optical cell. More specifically, the first embodiment of the present invention pertains to a display assembly that includes (a) a photovoltaic cell and (b) an electro-optical cell arranged in front of said photovoltaic cell and capable of having transparent regions for transmitting incident light to said photovoltaic cell, wherein said photovoltaic cell is arranged to reflect predetermined visible wavelengths of light transmitted through said electro-optical cell, so that said photovoltaic cell forms a coloured reflector behind said electro-optical cell.

The remaining embodiments in accordance the present invention all incorporate the features of the first embodiment. A major advantage of the display assembly of the present

invention is that the photovoltaic cell reflects a predetermined color, which will form the background color of the display. This feature assures a simplified structure and minimizes the loss of light energy available to the photovoltaic cell by eliminating the need for inserting an additional semi-reflective device between the electro-optical cell and the photovoltaic cell.

The Rejections

Claims 6-9 and 13 stand rejected under 35 U.S.C. 112 as indefinite. Claims 1-13 have also been objected to by the Examiner for having multiple minor informalities.

Claims 1, 2, 4, 5, 10, 11 and 13 stand rejected under 35 U.S.C. 103(a) as unpatentable over Ebihara et al. (U.S. Patent 5,990,995). Claim 3 stands rejected under 35 U.S.C. 103(a) as unpatentable over Ebihara in view of Taga et al. (U.S. Patent 4,583,815). Claims 6 and 7 stand rejected under 35 U.S.C. 103(a) as unpatentable over Ebihara in view of Arya et al. (U.S. Patent 5,403,404). Claims 8 and 9 stand rejected under 35 U.S.C. 103(a) as unpatentable over Ebihara in view of Arya et al. (U.S. Patent 5,403,404), and further in view of Ziegler et al. (U.S. Patent 6,459,035 B2). Claims 8 and 9 also stand rejected under 35 U.S.C. 103(a) as unpatentable over Ebihara in view of Arya et al. (U.S. Patent 5,403,404), and further in view of Kariya et al. (U.S. Patent 5,456,762).

Claims 1-13 stand rejected under the judicially created doctrine of obviousness-type double patenting as unpatentable over claims 1-7 of the Ziegler et al. Patent (6,459,035 B2) in view of Ebihara et al.

Applicants respectfully traverse the rejection and request reconsideration of the application for the following reasons.

Applicants' Arguments

The present amendment places the claims in compliance with 35 U.S.C. 112 and obviates the Examiner's objections as well.

103 Rejections and the Ebihara Patent

The Ebihara Patent describes a “reflection type liquid crystal display device for converting incident light into electric power” as shown in Figure 25 that includes a light scattering mode display element (37), a reflection layer (4) disposed at the back of the display element (37) for reflecting a specific color of the visible light, and a light absorbing layer (5) disposed at the back of the reflection layer (4), (col. 23, lines 13-21). The light scattering mode display element (37) includes a liquid crystal layer (3), (col. 23, lines 56-60). The reflection layer (4) is for “reflecting a specific color in the visible light regions and transmitting most of the light in the visible light region and in the near-infrared region” (col. 31, lines 6-10). The light absorbing layer (5) may be a “solar cell” that generates an output of $1.5\text{-}1.9\text{ }\mu\text{A}/\text{cm}^2$ at the operating voltage of 1.5 V (col. 25, lines 4-6 and 37-39). The Examiner maintains that Ebihara teaches “said photovoltaic cell [15] forms a colored reflector behind said electro-optical cell [37]” (Office Action dated March 26, 2003, page 8, lines 22-23). However, the Examiner does not indicate where in the Ebihara Patent this feature is taught. *In re Rijckaert*, 28 U.S.P.Q.2d. 1955, 1957 (Fed. Cir. 1993). Furthermore, Applicants assert that the Examiner has misinterpreted the teachings of the Ebihara Patent and, therefore, has not given a fair reading to the reference. *In re Gordon*, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

Specifically, the Ebihara Patent teaches that the solar cell (15) is a “light absorbing layer” (col. 25, lines 4-6) and the Examiner asserts that Ebihara’s solar cell (15) has the features of the “photovoltaic cell” recited in Applicants’ claim 1. However, those skilled in the art would realize that a conventional solar cell is constructed to absorb light and does not reflect light. This is evident from the Ebihara Patent wherein the solar cell (15) is used as a “light absorbing layer” so as to generate electric power.

There is nothing in the Ebihara reference to teach, or even suggest, that Ebihara’s solar cell is a “photovoltaic cell form[ing] a coloured reflector” as recited in claim 1. On the contrary, because Ebihara’s conventional solar cell is a photovoltaic cell that maximally absorbs light it cannot be a “coloured reflector.”

The Ebihara Patent teaches the placement of a “reflection layer” (4) between the liquid crystal display (37) and the solar cell (15), (i.e., the photovoltaic cell). This is similar to the structure taught by Japanese Patent 60-147720 A discussed in the instant specification (page 1, lines 17-34). Applicants’ disclosure adequately distinguishes the structure taught by the Ebihara Patent and the Japanese Patent 60-147720 A from the structure of the present invention, wherein “the photovoltaic cell itself...reflects light of a desired colour...without it being necessary to insert other filtering or reflective layers between the two cells” (specification, page 2, lines 12-19, emphasis added).

The Examiner should note that the Ebihara Patent corresponds to European Patent No. 0 814 365, which is explained on page 2, lines 1-11 of the present specification and distinguished from the display assembly of the present invention because Ebihara’s display requires a reflective layer in addition to the solar cell.

Ebihara teaches that the reflection layer (4) and the solar cell (15) are distinct structures because an adhesive layer (14) is used to attach these two separate structures together. In essence, the Ebihara’s “reflection layer” is a reflective layer that has been inserted between the display element (37) and the solar cell (15). The distinction between claim 1 and the Ebihara reference is clearly explained in the present specification (page 2, lines 12-19).

Claims 5, 10 and 13

Claim 5 depends upon claim 1 and further recites “the reflection of said predetermined wavelengths is an interferential reflection via a multi-layered reflective filter including a transparent top electrode of said photovoltaic cell.” The embodiment of the invention in accordance with claim 5 specifies a particular type of photovoltaic cell capable of reflecting a predetermined color and having a simple and efficient structure. According to the embodiment of claim 5, the photovoltaic cell includes an interferential multi-layered reflective filter that includes the transparent top electrode of the photovoltaic cell to ensure reflection by the photovoltaic cell.

Nothing in the Ebihara Patent teaches, or even suggests, this feature recited in claim 5. It is noted that when the Examiner refers to Figures 2A and 2B of the Ebihara Patent (Office

Action dated March 26, 2003, page 9, lines 5-19), the described device includes the light absorbing layer (5) and not the solar cell (15). The Examiner appears to suggest that, in the embodiment of Figures 2A and 2B, the light absorbing layer (5) could be replaced with the solar cell (15). However, such a modification would facially fail to teach that the "multilayered reflective filter include[es] a transparent top electrode of said photovoltaic cell" as recited in claim 5. Specifically, the electrode (2b) is not a component of the light absorbing layer (5). Therefore, the electrode (2b) would not be a component of the solar cell (15) even if the substitution of the solar cell for the light absorbing layer was made. In fact, those skilled in the art would recognize that electrode (2b) is a component of the liquid crystal cell, and not to any solar cell.

Applicants assert that the manner in which the Examiner disassembles and reassembles, in the March 26th Office Action (page 9, lines 5-19), "Embodiment 1," Figures 2A and 2B, and "Embodiment 9," Figure 25, col. 25, lines 9-20, is neither taught, suggested, or even foreseeable from the reference. While Figure 25 teaches that the reflection layer (4) includes a dielectric multi-layered film (39), the glass (40) completely separates film (39) from the solar cell (15). Consequently, the Ebihara Patent cannot suggest any combination of the dielectric film (39) with a top electrode of the solar cell (15).

Claim 10 depends upon claim 5 and further recites that the "top electrode is covered with a transparent or slightly diffusing layer." The top electrode of the photovoltaic cell, in accordance with Applicants' invention, takes part in the interferential reflection because of the claimed feature. Ebihara does not teach or suggest this feature, thus claim 10 is allowable. Applicants believe that the Examiner's misinterpretation of the electrode (2b) of the liquid crystal cell to be an electrode of the solar cell (15), as discussed above, has lead the Examiner to an erroneous conclusion.

Claim 13 now recites "analogue time display means," which the Ebihara Patent does not teach or even suggest.

Other Prior Art References

Applicants make the following comments about the relevant prior art. To combine references under 35 U.S.C. 103, it must be shown that (a) the prior art would have suggested to those skilled in the art that they should make the claimed device, that (b) the prior art would have revealed that in so making, those of ordinary skill in the art would have a reasonable expectation of success, and that (c) both the suggestion and reasonable expectation of success is founded in the prior art and not in the Applicant's disclosure. *In re Vaeck*, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991).

The Taga Patent teaches "heat wave shielding lamination" that could be applied to the surface of a solar cell to be used as an "anti-reflection, transparent electrode." The use of such heat shielding lamination for a solar cell would render the solar cell anti-reflecting (col. 21, lines 55-59), which is completely the opposite of what is claimed in claim 1 wherein the "photovoltaic cell forms a coloured reflector." Consequently, there is no proper motivation to combine the teachings of the Taga Patent with the Ebihara Patent.

The Arya Patent teaches "multifunction photovoltaic device and method of manufacture," wherein the multifunction photovoltaic device includes amorphous silicon p-i-n photovoltaic cells in stacked arrangement (See Abstract). However, the Arya Patent does not teach a photovoltaic cell that forms a coloured reflector as recited in claim 1.

The Kariya Patent teaches "photoelectric conversion elements," such as are used as solar cells (col. 2, lines 36-40), and in Figure 4 the photoelectric conversion element includes a light reflection layer (143) with an irregular surface (col. 5, lines 15-20). However, the Kariya Patent does not teach, or even suggest, that the "photovoltaic cell forms a coloured reflector" as recited in claim 1.

The Ziegler Patent teaches a "photovoltaic cell having a colored appearance, particularly for a watch dial." The Ziegler Patent was granted on October 1, 2002 and has an effective date as a reference under 35 U.S.C. 102(e) of December 18, 2000. However, the present application was filed July 23, 2001 and claims priority to the Swiss priority document 1442/00, filed July 21, 2000. Applicants have previously provided the U.S. Patent and Trademark Office with a certified copy of this Swiss priority document. Applicants presently

submit a certified English translation of the Swiss Priority document, thereby perfecting the section 119 priority claim in accordance with 37 C.F.R. 1.55 (a)(4). In this manner, the Ziegler Patent is rendered invalid as prior art so no further comment regarding this reference is necessary.

Neither the Ebihara Patent, the Taga Patent, the Arya Patent nor the Kariya Patent teach, or even suggest, that the "photovoltaic cell forms a coloured reflector" as recited in claim 1. Therefore, no combination of these references can anticipate or render obvious the subject matter of claim 1. Furthermore, the Ziegler Patent is not valid prior art against Applicants' claims in view of the presently filed certified English translation of the Swiss priority document 1442/00.

The Obvious-type Double Patenting Rejection

Claims 1-13 of the present application have been rejected under the doctrine of obviousness-type double patenting in view of claims 1-7 of the Ziegler Patent. The policy grounds for obviousness-type double patenting is to prevent an improper extension of a common monopoly. *In re Sutherland*, 146 U.S.P.Q. 485, 488 (C.C.P.A. 1965). A double patenting problem can arise as to a subsequent patent application only if a prior patent has issued to the same inventive entity or assignee. See Chisum on Patents, §9.03[1], fn 2. This obviousness-type double patenting rejection is untenable in the present case for the following reasons.

First, courts may consider the issue of obviousness-type double patenting when there is either a common inventive entity such as in *In re Goodman*, 29 U.S.P.Q.2d 2010, 2012 (Fed. Cir. 1993), or when there is a common assignee such as in *In re Braat*, 19 U.S.P.Q.2d 1289, 1293 (Fed. Cir. 1991) and *In re Kaplan*, 229 U.S.P.Q. 678, 683 (Fed. Cir. 1986). However, in the present case, there is neither a common inventive entity nor a common assignee. Therefore, for this reason alone, the Examiner's obviousness-type double patenting rejection is improper and should be withdrawn.

Specifically, Platz, Saurer and Basturk form the inventive entity for the present application whereas the inventive entity for the Ziegler Patent is provided by Ziegler, Fisher,

Saurer, and Viennet. The assignee for the present application is Eta SA Fabriques d'Ebuaches, whereas the assignee for the Ziegler Patent is Asulab, S.A. The policy consideration supporting the judicially created doctrine of obviousness-type double patenting is to prevent the extension of patent rights beyond statutory limits by claiming subject matter in different applications that is different but not patentably distinct. Goodman at 2015. However, Applicants believe it is not possible to have double patenting where there is both a different inventive entity and a different assignee.

Second, the Federal Circuit has ruled that double patenting rejections require an analysis of the claims and not the disclosure of the patents whose claims are relied upon to demonstrate double patenting. General Foods Corp. v. Studiengesellschaft Kohle mbH, 23 U.S.P.Q. 1839, 1846 (Fed. Cir. 1992). In the present case, the Examiner has not established a *prima facie* case of obviousness-type double patenting because the Examiner has not compared the claims of the Ziegler et al. Patent to the claims of the present application. To facilitate prosecution, Applicants provide such a comparison in Table 1 below. Only claim 1 of the present application is compared to claim 1 of the Ziegler Patent because claim 1 of the present invention is believed to be the broadest claim.

Table 1

U.S. Patent 6,459,035 B2	U.S. Application No. 09/536,760
Does not claim a display assembly	1. A display assembly including
a colored photovoltaic cell including from the bottom to the top a substrate,	a photovoltaic cell
a reflective bottom electrode placed on said substrate or integrated therein,	
an active photodiode part formed of semiconductor layers having a first refractive index,	
a transparent top electrode having a second refractive index and an optical interface with the active photodiode part,	
and a layer of clear lacquer formed on the top electrode and having a third refractive index and an optical interface with the top	

electrode, said first, second and third refractive indices being different from each other,	
wherein the pair of respective thicknesses of the top electrode and the active photodiode part produce an interferential reflection of incident light according to a colored reflection spectrum that is a function of said first, second and third refractive indices.	
Does not claim an electro-optical cell	and an electro-optical cell arranged in front of said photovoltaic cell and capable of having transparent regions for transmitting incident light to said photovoltaic cell.
Does not claim the photovoltaic cell forms a colored reflector behind the electro-optical cell.	wherein said photovoltaic cell is arranged to reflect predetermined visible wavelengths of light transmitted through said electro-optical cell, so that said photovoltaic cell forms a coloured reflector behind said electro-optical cell.

Consequently, because there are multiple differences and mutually exclusive and missing elements between the claims of the present application and claim 1 of the Ziegler et al. Patent, no *prima facie* case of obviousness-type double patenting has been shown, with or without the teachings of the Ebihara et al. Patent. Clearly, the Examiner has not shown that the same invention has been claimed twice, or that the application claims a merely obvious variation. General Foods at 1840.

Conclusion

Claims 1-13 are in compliance with 35 U.S.C. 112. The obviousness-type double patenting rejection is untenable and should be withdrawn because there is neither the same inventive entity nor a common assignee so it is not possible to extend the limits of the claims. Furthermore, the Examiner has not established a *prima facie* case of obviousness-type double patenting by comparing the claims to the claims.

The rejection of claim 1 over the Ebihara Patent, which corresponds to EP 0 814 365 discussed in the instant specification, is untenable and should be withdrawn because Ebihara

does not teach, or even suggest, that the "photovoltaic cell forms a coloured reflector behind said electro-optical cell" as recited in claim 1. Applicants also note that the present filing of a certified English translation of the Swiss priority document 1442/00 with the U.S. Patent and Trademark Office has removed the Ziegler Patent as valid prior art against the claims of the instant application.

For the reasons discussed above, claims 1-13 are in condition for allowance and a prompt notice of allowance is earnestly solicited.

Questions are welcomed by the below signed attorney for the Applicants.

Respectfully submitted,

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Date: 9-15-03

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